

Non-cancer Risk Formula (with volatilization factor):

$$Cs = [(THQ * BWc * AT) / (ED * EF * ((1/RfDo * RAFo * CF * IRSc) + (1/RfDi * IRAc * (1/PEF + 1/VF)) + (1/RfDo * CF * RAFd * I)))$$

C5-C8 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	13
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, May 2002)	6.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, May 2002)	5.70E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	1419
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

C9-C12 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	72
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, May 2002)	1.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, May 2002)	5.70E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	8563
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.5
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

C9-C10 AROMATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	12
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, May 2002)	3.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, May 2002)	5.70E-03
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	13094
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.5
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

C9-C18 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	135
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, May 2002)	1.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, May 2002)	5.70E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	17605
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.5
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

C11-C22 AROMATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	66
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, May 2002)	3.00E-02
RAFo (Chemical specific oral absorption factor - unitless; MADEP, October 2002)	3.60E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; MADEP, May 2002)	5.70E-03
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	78193
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

MTBE	
Parameters	Values
Cs (Soil concentration - mg/kg)	231
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; EPAIX, October 2002)	3.30E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, September 2003)	8.57E-01
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	6018
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

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TOLUENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	71
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, September 2003)	2.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, September 2003)	1.14E-01
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	3971
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

ETHYLBENZENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	175
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, September 2003)	1.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, September 2003)	2.86E-01
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	4601
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

XYLEMES	
Parameters	Values
Cs (Soil concentration - mg/kg)	20
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS, September 2003)	2.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, September 2003)	2.90E-02
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
VF (Volatilization factor - m^3/kg; EPA, May 1996)	4302
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.03
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

Non-cancer Risk Formula (without volatilization factor):

$$\text{Cs} = [(\text{THQ} * \text{BWc} * \text{AT}) / (\text{ED} * \text{EF} * ((1/\text{RfDo} * \text{CF} * \text{IRSc}) + (1/\text{RfDo} * \text{IRAc} * 1/\text{PEF}) + (1/\text{RfDo} * \text{CF} * \text{RAFd} * \text{DFc})))]$$

C19-C36 ALIPHATICS	
Parameters	Values
Cs (Soil concentration - mg/kg)	19,552
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; MADEP, May 2002)	2.00E+00
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; MADEP, October 2002)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

NAPHTHALENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	195
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS September 2003)	2.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
RfDi (Chemical specific inhalation reference dose - mg/kg-day; IRIS, September 2003)	8.60E-04
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

ANTHRACENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	2,933
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS September 2003)	3.00E-01
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

ACENAPHTHENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	587
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS September 2003)	6.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

FLUORANTHENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	391
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS September 2003)	4.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

FLUORENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	391
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS September 2003)	4.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

PYRENE	
Parameters	Values
Cs (Soil concentration - mg/kg)	293
THQ (Target hazard quotient)	0.125
BWc (Child body weight - kg; EPA, August 1997)	15
AT (Averaging time - day; EPA, December 1989)	2190
ED (Exposure duration - yr; EPA, December 1989)	6
EF (Exposure frequency - day/yr; EPA, December 1991)	350
RfDo (Chemical specific oral reference dose - mg/kg-day; IRIS September 2003)	3.00E-02
CF (Conversion factor - kg/mg; EPA, December 1991)	1.E-06
IRSc (Child soil ingestion rate - mg soil/day; EPA, August 1997)	200
IRAc (Child inhalation rate - m^3/day; EPA, August 1997)	12
PEF (Particulate emission factor - m^3/kg; EPA, May 1996)	1.10E+09
RAFd (Chemical specific dermal relative absorption factor - unitless; EPAIII, Dec. 1995)	0.1
DFc (Child dermal factor - mg/day; EPA, August 1997)	97

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